

# Module 12: Antibiotics & Dysbiosis

Collateral damage — how antibiotics reshape the microbiome and what to do about it.

Tracks: Core, Clinical, Advanced | Duration: 50 min

## KEY TAKEAWAYS

- A single antibiotic course can alter the microbiome for months; some taxa never fully recover.
- Broad-spectrum antibiotics are worse than narrow-spectrum for microbiome collateral damage.
- Early childhood antibiotic exposure is epidemiologically associated with increased allergy, obesity, and autoimmune risk — but causality is hard to prove.

## EVIDENCE-GRADED CLAIMS

Antibiotics cause lasting microbiome changes	<b>A — Clinically established</b>	Longitudinal studies confirm incomplete recovery at 6+ months for some taxa.
Early childhood antibiotics increase obesity risk	<b>C — Promising, preliminary</b>	Epidemiological association; confounded by infection severity, diet, and other factors.
Co-prescribing probiotics prevents all antibiotic side effects	<b>E — Popular, weak support</b>	<i>S. boulardii</i> prevents AAD specifically; not a blanket solution.

## CLINICAL CASE

### The physician who pre-prescribes probiotics with every antibiotic

A colleague routinely co-prescribes a generic 'probiotic blend' (no strain specified, 5 billion CFU) with every antibiotic course. She argues it 'can't hurt' and patients expect it. She asks for your evidence-based perspective.

*How would you discuss strain-specific vs generic probiotic evidence, the Suez et al. finding that probiotics can delay microbiome recovery, and when co-prescribing is evidence-based?*

## SUMMARIES

### For Patients

Antibiotics kill harmful bacteria, but they also damage your beneficial gut bacteria. A single course can change your microbiome for months. This is why *C. diff* infections happen — antibiotics clear out the competition, and *C. diff* moves in. Taking antibiotics only when truly needed is one of the most important things you can do for your microbiome.

### For Clinicians

Antibiotic-induced dysbiosis follows a predictable pattern: diversity drops within days, Proteobacteria bloom (especially *E. coli*), and anaerobic commensals (*Bacteroides*, *Clostridiales*) are suppressed. Recovery takes weeks to months and is often incomplete — some species lost after ciprofloxacin or clindamycin courses don't return for >12 months. The CDI paradigm: antibiotics create ecological vacancy → *C. diff* spores germinate → toxin production → colitis. Stewardship: narrow-spectrum when possible, shortest effective duration, consider co-prescribing *S. boulardii* for CDI prevention in high-risk patients.

## REFERENCES

- Recovery of gut microbiota of healthy adults following antibiotic exposure — Palleja A et al., Nat Microbiol 2018 [\[Link\]](#)